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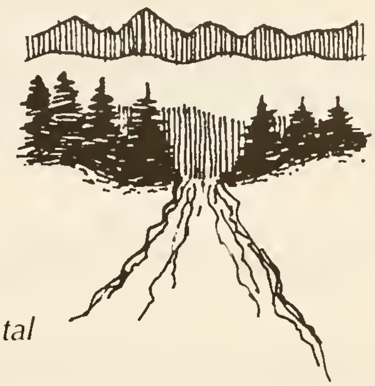
Progress, Silver Bow Creek superfund site report

NOVEMBER 1988

PROGRESS

Silver Bow Creek Superfund Site Report

By Montana Department of Health and Environmental Sciences & Environmental Protection Agency



INTRODUCTION

Butte has been chosen as the site for the testing of a new technology to treat various types of Superfund site contaminants. Montana Department of Health and Environmental Sciences will first seek public comments about the proposed project. This progress report will describe the project, the opportunity for public comment and the future of the program.

The project is being run by the U.S. Environmental Protection Agency, with cooperation from the U.S. Department of Energy and the Montana Department of Health and Environmental Sciences. The treatment technology these agencies plan to test in Butte is called a "plasma furnace" (in this usage, "plasma" refers to a gas which is so hot it can conduct electricity). Contaminated soils will be thermally oxidized by extremely high temperatures in the plasma furnace to destroy their toxicity. The plasma furnace is explained in more detail later in this report.

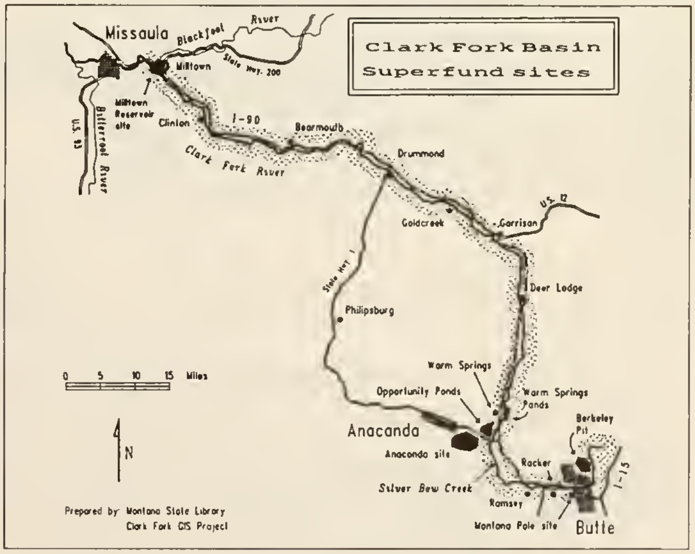
The contaminated soils to be tested during the demonstration will be taken from the Montana Pole and Silver Bow Creek Superfund sites. The Montana Pole site is located on the south side of Butte. It is a defunct pole-treating operation with contamination consisting primarily of organic wastes such as pentachlorophenol. The Silver Bow Creek site begins in Butte and continues down the Silver Bow Creek and Clark Fork drainages to the Milltown Reservoir, about five miles east of Missoula. Contaminants on this site are mostly the result of mining and smelting operations.

The public will be given the opportunity to comment on this project for 30 days, from Nov. 15 - Dec. 15, 1988. (See section on Public Comment).

TESTING TO TAKE PLACE IN BUTTE

The proposed plan for the demonstration includes testing to be conducted at the Department of Energy's Component Development and Integration Facility (CDIF) on the south edge of Butte, which primarily has been used to test magnetohydrodynamics (MHD). The project will begin in late spring or early summer 1989, lasting approximately seven months. The project will be broken into two phases. The first phase, lasting about a month, will involve testing the unit on organic and heavy metal contaminants from Butte area Superfund sites — the Montana Pole and the Silver Bow Creek sites. The second phase will last six months and will help DOE researchers determine the endurance and reliability of the system. During the second phase, DOE will also determine how effective the process is for materials which resemble contaminants found at some DOE sites. All samples to be tested will be from the Butte area. No samples will be brought into the state for the second phase.

Throughout both phases, the three involved agencies will work closely with each other and Retech, Inc., the owners and makers of the furnace, to evaluate its efficiency in terms of time, money, and destruction of contaminants.



WHAT IS THE "SITE" PROGRAM?

SITE is an abbreviation, or acronym, for Superfund Innovative Technology Evaluation. Under this program, EPA is trying to find better solutions for hazardous waste cleanup. The SITE program at Butte includes carefully planned demonstrations of the plasma arc furnace technology developed by Retech, Inc., of California.

EPA started the SITE program in 1986 so they could take positive steps to provide more information on new or innovative treatment technologies that will be needed in the future. The SITE program's objective is to develop, demonstrate, and encourage the use of successful alternative technologies.

PLASMA FURNACE IS SAFE

The Retech Plasma Furnace is an innovative heat treatment system, or furnace, which is currently being tested at the Retech home office in Ukiah, California. The furnace will be brought to Montana to help EPA determine how effective it will be at destroying contamination often found at Superfund sites.

The plasma furnace destroys toxic organic molecules and ties up heavy metals in a non-leaching glass. Toxic material to be heated in the furnace is placed in a feeder and then continues into the primary furnace at a rate of about 100 pounds per hour. The main furnace chamber and all parts of the system are kept sealed so that all material stays within the system until the toxic wastes are destroyed in either the primary or secondary furnace chamber. Hot gases from the furnace are cleaned and purified by a "scrubber"; contaminants in the gases are removed into water which is later disposed of after testing. After passing through the scrubber, the gas then passes through an activated charcoal system for added safety before being released into the atmosphere. (See diagram of plasma furnace).

The process will be continuously monitored during operation and all exhaust will be extensively sampled. If a problem occurs in the process, a safety back-up system goes into effect and collects the gases. No gases are released until the system is checked and/or fixed. Any gas temporarily stored during a breakdown is reprocessed through the reactor and gas cleaning system before being released.

Any residues will be disposed of at an approved solid waste or, if necessary, hazardous waste facility.

DEMONSTRATION TO BEGIN IN LATE SPRING 1989

The EPA phase one SITE demonstration will occur over a five-week period starting in late spring or early summer 1989. The furnace will be sent from California to Butte and will take approximately two weeks to set up at the CDIF facility. During the remaining three weeks, approximately 2,000 pounds of waste from the Montana Pole and Silver Bow Creek Superfund sites will be processed in the plasma furnace.

EPA plans to meet four objectives during phase one of the tests:

1. Determine the furnace's efficiency in removing organic contaminants from soils.

2. Determine how well the reactor can tie up heavy metals in a glass-type waste.

3. Determine costs of the process.

4. Evaluate how well the furnace performs and how reliable it is.

The U.S. Department of Energy will conduct the second phase of the demonstration and will build on what was learned during the EPA's first phase. This phase will last six months while DOE tests the system at higher feed rates and with other wastes. "Wastes" in this phase will primarily consist of clean soil with simulated contaminants mixed into it. The purpose of this second phase is for DOE to see how effectively the system can treat their wastes and to see how durable the system is. DOE hopes to determine whether the system can run for longer periods of time and with greater amounts of waste than in phase one. DOE will also evaluate the costs of the system.

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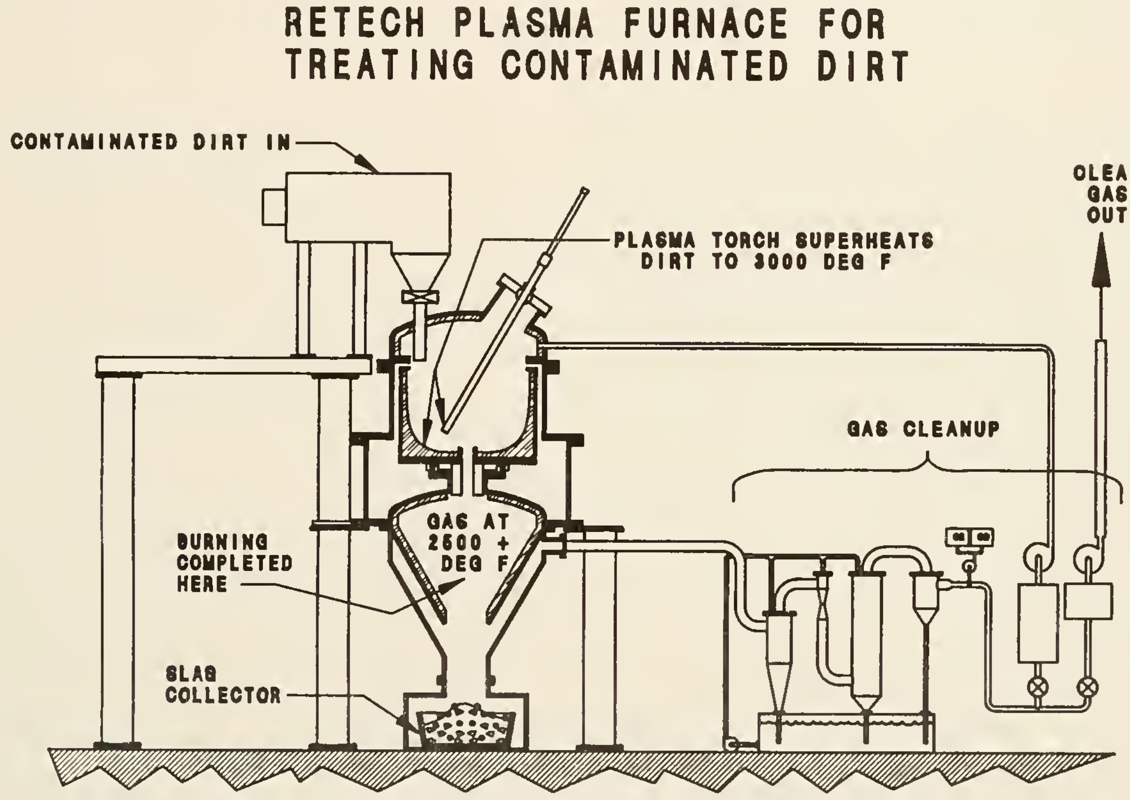
CAN THIS TECHNOLOGY CLEAN UP BUTTE?

Although the plasma furnace system, if successful, will destroy organic contaminants and contain heavy metals, it will not be a practical cleanup remedy for the majority of wastes in Butte. With the many thousands of tons of contaminated soils in the Silver Bow Creek and Montana Pole sites, it would be too costly. However, if the plasma furnace proves successful, it may be helpful in cleaning up small, heavily contaminated areas in Butte, along the Silver Bow Creek site, and on the Montana Pole site.

In any case, if the plasma furnace is successful, it will benefit the Superfund program by providing us with one more way to clean up Superfund wastes.



RETECH PLASMA FURNACE FOR TREATING CONTAMINATED DIRT

WE ARE LOOKING FOR YOUR COMMENTS

A 30-day public comment period will begin Nov. 15 and will run through Dec. 15. During that time, the public is encouraged to comment on the plan and ask questions about it. Further information about the SITE program and the plasma furnace can be found at the Montana Tech Library in Butte. Anyone with comments or questions is encouraged to call or write to:

Janie Stiles
Montana Department of Health and Environmental Sciences
Room B201, Cogswell Building
Helena, MT 59620
1-800-648-8465 (in-state) or 406-444-2821.

Comments must be postmarked by Dec. 15 to be considered by EPA. Comments sent to the above address will be reviewed by the Montana Department of Health and Environmental Sciences and responded to by EPA.

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JULY 1988

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Silver Bow Creek Superfund Site Report

By Montana Department of Health and Environmental Sciences & Environmental Protection Agency

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Dear Readers,

Activites have been moving right along all winter and through the spring on the Silver Bow Creek Superfund site. And although we have been busy, we will be even busier on the site this summer and fall. There are more details in the other sections of this fact sheet, but to give you a preview of the activities ... we will have a draft Warm Spring Ponds Feasibility Study ready for public review late this fall or early in the winter. An interesting project in the works now is the Streambank Tailings and Revegetation Study being conducted by contractors CH2M Hill, Northern Engineering and Testing, Montana State University, and Schafer and Associates, under the direction of Montana Department of Health and Environmental Sciences (MDHES) and U.S. Environmental Protection Agency (EPA). The Flood Modelling Study, Public Health Environmental Assessment and the Clark Fork Screening Study are also going well. Read on for more details.

Looking back

The Silver Bow Creek Superfund site begins and the headwaters of Silver Bow Creek near Butte, continues down Silver Bow Creek to the Warm Springs Treatment Ponds, down the Clark Fork River, to the Milltown Reservoir five miles east of Missoula. More than 100 years of silver, gold, and copper mining has resulted in mining wastes being deposited into, and washed down, Silver Bow Creek and then into and along the Clark Fork River. These mining wastes contain arsenic and heavy metals including cadmium, copper, lead, iron, and zinc. Other contaminants include by-products of sewage, wood treatment, phosphate and manganese production, and chemical manufacturing. The wastes deposited along the banks of Silver Bow Creek and the Clark Fork River are toxic to fish and plant life and may pose a threat to human health.

Following is a brief chronology of the major activities on the Silver Bow Creek Superfund site:

1983 - Silver Bow Creek became a Superfund site

1984 - MDHES and EPA began investigation of site contamination

1986 - Phase I Remedial Investigation completed

1987 - Operable Unit Phase II Remedial Investigations began

1988 - Feasibility Study for the Warm Springs Ponds began.

Because the Silver Bow Creek Superfund site is so large and so complex, MDHES and EPA have broken it down into smaller parts, known as operable units. These operable units are classified according to their general problem and where they are located. This makes site management (investigation and cleanup) more efficient.

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PLEASE RETURN

Looking back

(Cont. from pg. 1)

Following is a list of the operable units of theSilver Bow Creek site:

1) Warm Springs Treatment Ponds
2) Streamside Tailings.
3) Rocker Timber Treating Plant
4) Agricultural Lands of the Deer Lodge Valley
5) Area I (from the Weed Concentrator in Butte, down Silver Bow Creek, to the Colorado Tailings on the southwest side of Butte).
6) Clark Fork River

Risk to public health being assessed

When deciding how to clean up a Superfund site, MDHES and EPA must consider how the contaminants may cause risk to public health and the environment. This process is known as the Public Health and Environmental Assessment. To write an assessment, the author must have extensive information on the contaminants at the site as well as information on how likely the public is to come in contact with those contaminants. Other necessary information includes contaminant concentrations and toxicity, possible routes of exposure, and human intake of contaminants.

MDHES and EPA are currently compiling information for the Public Health and Environmental Assessment for the Silver Bow Creek site. Before release of the report, information will be gathered in Ramsay and Rocker, concentrating primarily on those areas used most by people — playgrounds and residential yards. No preliminary information is publically available at this time; however, a draft is expected around November this year for public review.

Flood study ready

With the help of a computer, contractors for MDHES have developed a model which will simulate various types of floods in the Clark Fork Basin. So what good is a model and why not wait for a real flood?, you might ask. It could be a long time before another occurs. On the other hand, it could happen next year. First of all, one such flood being recreated on the computer is known as a 100-year flood. This is a large flood which occurs on the average of once every 100 years. Because a 100-year flood event is so large, MDHES and EPA are concerned that it could literally wipe out the Warm Springs Ponds System through failure of the dikes. Such a failure could wash about 20 million cubic yards of heavy metal-laden sediment down the Clark Fork River.

The flood model will help MDHES and EPA determine how much water and sediment could be transported to the ponds during a high flow event. With this information, MDHES can evaluate design changes to the ponds to handle these large flows.

In preparing the model, the contractors, based in Helena, are using various types of information including records of past floods. At this time, they know that an especially large flood occurred in 1908, causing Silver Bow Creek to look like the Platte River, according to Butte's newspaper at that time. Other information put into the system includes area geography, soil types, man-made structures, etc.

The Draft Flood Modelling Study Report was completed in July and the final report should be available in August.

Innovative study to revegetate streambanks

An innovative study is being conducted for MDHES by their contractors. The study is called STARS (Streambank Tailings and Revegetation Study). The purpose of STARS is to develop and test new methods to change the metals-rich soils along the banks of Silver Bow Creek so metals are less available and thus plants can grow there. Because of mining wastes, the Silver Bow Creek's banks are typically high in acid and metals and low in nutrients — poor conditions for plant growth. Anyone who has walked along Silver Bow Creek or driven from Butte to Warm Springs can't help but notice the large, bare areas along the creek.

Renewal of plant life along Silver Bow Creek is important not only visually, but also because plants will help keep the metals from washing downstream during high water and from migrating down into the groundwater. Furthermore, plant growth will help keep the tailings from being blown by wind. Inhalation of the heavy metals is not good for human health.

Because a wide-scale, on-site study would be terribly expensive and difficult to evaluate, Montana State University and Schafer and Associates are first conducting initial studies on a smaller scale in their greenhouses and laboratories in Bozeman. The greenhouse conditions are carefully controlled, right down to the temperature and day length of the Silver Bow Creek area. The researchers will narrow the range of soil additives and plant species and choose the most promising combinations for field studies. Among the plants being tested are some already found growing in tailings along Silver Bow Creek, acid-resistant plants from Wyoming, and commercially sold acid-tolerant plants. Plants chosen for the field studies must show resistance not only to acid but also to excessive drainage in sandy soils, poor infiltration in heavy clay soils, alkaline or saline materials, trace nutient excesses and deficiencies, extreme weather conditions, and wind.

The soils chosen for the study are varied and best represent the types of mining waste-contaminated soils along the banks of Silver Bow Creek. The metal-laden soils are then neutralized by adding compounds, such as lime, to make soils more hospitable to plants. Researchers will also determine to what depth the additives must be tilled. Four main types of soils have been found along Silver Bow Creek and are being used for the study. Each may require different kinds of changes.

Although STARS is on-going, it is only one of a number of choices to be considered in the final decision in cleaning up the banks of Silver Bow Creek.

We will need your comments

Later this year, MDHES and EPA will present to the public several alternatives for making the Warm Springs Treatment Ponds safer, more stable, and more efficient. The ponds are located east of the town of Warm Springs. The pond system safeguards the Clark Fork River from contaminated water and sediments flowing down Silver Bow Creek. The Anaconda Company constructed the first treatment pond in 1911 to trap sediments carried down the creek from mining and smelting operations in Butte and Anaconda. Additional ponds and other adjustments have been made periodically since that time. The ponds slow the creek water so the contaminated sediments will settle to the bottom. Lime is added periodically to cause additional contaminants to settle.

MDHES and EPA are concerned that the pond system is not completely safe, however, and may fail in the event of an earthquake or a large flood. Such an event could cause the release of tons of contaminated sediment to the Clark Fork River.

The remedial investigation studies by MDHES and EPA began in 1987 and will conclude this summer. Many factors have been considered, including the quality of surface water, groundwater, surrounding soils, sediments contained in the ponds, etc. The Feasibility Study is currently being conducted and is evaluating

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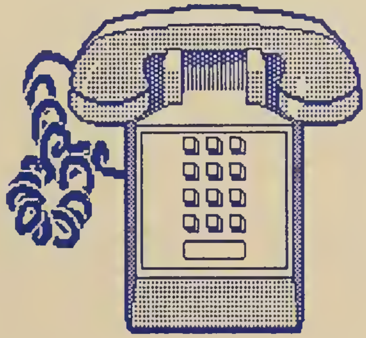
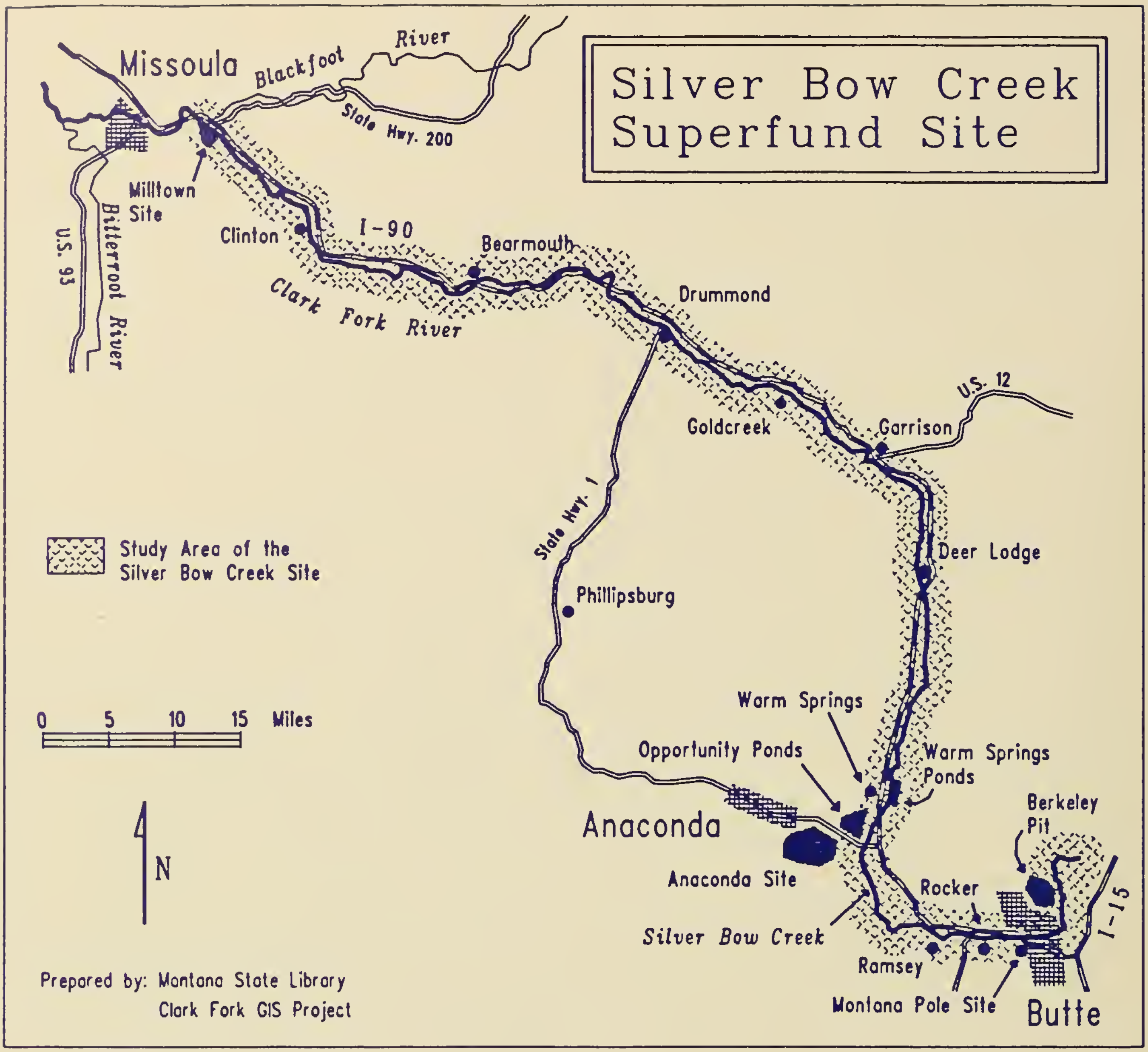
SUPERFUND TOLL-FREE HOTLINE



1-800-648-8465 IN MONTANA



Comments

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how well the ponds do their job and how they may be improved. Later this year, probably this fall, MDHES and EPA will present the results of the Feasibility Study for the Warm Springs Ponds. This document will outline the various alternatives for making the system safe. A public meeting will be held to present the options and a 30-day comment period will also be held so the public can review the Feasibility Study and make appropriate comments.

Problems other than susceptibility to earthquakes and floods are also being addressed in the Warm Springs Ponds Study. They include the following:

1) Fish kills in the Mill-Willow Bypass and downstream.
2) Gradual erosion of the banks of the Mill-Willow Bypass.
3) Contamination of nearby groundwater.
4) Direct human contact with contaminants.
5) Contaminants going through the system into the Clark Fork River.

The study has several purposes, aside

from stabilizing the ponds during flood and earthquakes. They are as follows:

1) Meet water quality standards for metals in surface water.
2) Manage high flows and the resulting problems of increased sediments being transported to the Clark Fork River.
3) Reduce the levels of metals contamination in nearby groundwater.
4) Reduce the potential for people to be exposed to tailings and other surface contamination.

Screening Study in progress

The tailings problem doesn't end at the Warm Springs Ponds. It continues in the Clark Fork River to the Milltown Dam . This section of the Clark Fork River is part of the Silver Bow Creek site (see map, page 4). Prior to conducting a detailed Remedial Investigation and Feasibility Study, MDHES and EPA have been conducting a screening study on the area which will provide broad information about the area. Thus, MDHES and EPA will be able to make decisions about what steps to take next. The Clark Fork River Screening Study will be available to the public later this summer.

Rocker area under study

Near the turn of the century, the Rocker Timber Plant west of Butte on the banks of Silver Bow Creek provided treated timbers for the mines and ties for the railroads. Creosote and arsenic were used at the plant to preserve the wood. The site was abandoned and torn down in 1957. During studies of the area in June and July 1987, conducted by ARCO's consultants, creosote was found in soils near the defunct plant in an area approximately 100 feet wideand 16 feet deep, extending from the treating building to the edge of Silver Bow Creek. Although creosote material was seen adjacent to the creek, no creosote has yet been found in Silver Bow Creek from the Rocker Plant. Arsenic has been found in the soil and groundwater. In addition, cadmium, copper, and zinc in groundwater exceeded primary and secondary Federal Drinking Water Standards.

MDHES and EPA are evaluating ARCO's findings to determine the next step at the Rocker operable unit.

Hotline successful

Last year, MDHES installed a statewide toll-free Superfund hotline for the public to use when they have questions or comments about Superfund activities. The purpose of the line is to help the public get quick answers to questions without having to pay long-distance. Jane Stiles who operates the line says that if she doesn't have the answer to your question, she will find who does and will have them call you back. Questions for EPA may also be routed through the hotline. The number is 1-800-648-8465, and is in operation from 8 a.m. to 5 p.m. weekdays.

Are you on our mailing list?

MDHES maintains a mailing list of people interested in the Silver Bow Creek site. If you did not receive this fact sheet by mail and would like to be added to our mailing list for the site, please send your name, address, city, state, and zip colde. Please fill out this form if you have been on our mailing list and have recently changed your address.Please send your addition or change to:

Jane Stiles
Montana Dept. of Health and Environmental Sciences
Cogswell Building, Room B201,
Helena, MT 59620

Name ______________________________

Address ______________________________

City, State, Zip ______________________________

Please check one: